

# Basic Visual Assessment

## INTRODUCTION

Primary eye care is an essential component of primary health care. Since most of the blinding ocular conditions are preventable or curable, the availability of eye care services at the primary level can reduce the incidence of blindness in the community.

The backlog of cataract blindness is more in rural areas; early detection of operable cataracts at the primary level by health care personnel like vision technicians is of utmost importance. An early detection of glaucoma, error of refraction, squint and such other vision damaging eye ailments needs attention at the primary level. In this session, you will learn about the role of vision technician, optometrist, orthoptist, ophthalmologist (eye specialist) for basic visual assessment in the eye care services.

Various diseases of the eye can be detected by a systematic examination of eyes for example, recording visual acuity, refraction, ocular mobility, field of vision charting, external examination of eyes, intraocular pressure and colour vision test.

## SESSION 1: EYE CARE PROFESSIONALS

You will study about the roles and functions of ophthalmologist, optometrist and orthoptist.

## Ophthalmologists

This is a specialist for medically and surgically curable eye problems. An advanced education and training is required to become an ophthalmologist (Fig.5.1). After completion of MBBS degree, a postgraduate in ophthalmology is called an ophthalmologist.

## Optometrists

An optometrist (Fig. 5.2) need not study medicine like MBBS doctors. The optometrists provide only limited services of eye care. A diploma and bachelor's in optometry is a course where students undergo training for vision care services. Optometrists prescribe the number of spectacles and contact lenses at the initial stages.

## Orthoptists

They are not required to study medicine like an ophthalmologist. A full-time diploma/degree course is required to qualify for performing orthoptic treatment. Orthoptists deal with assessment diagnosis and management of the patient with eye muscle disorders. Orthoptists help the ophthalmologists for management of eye muscles disorder patients. Orthoptists serve patients of all age groups.



Fig. 5.1: An ophthalmologist at work



Fig. 5.2: An optometrist at work

## Practical Exercise

Visit an eye unit or clinic to understand the role of various eye care personnel.

## Check Your Progress

### A. Short answer questions (30–40 words)

1. What is ophthalmology?
2. What is the role of an optometrist?
3. What are the roles and functions of an ophthalmologist?

## SESSION 2: BASIC EXAMINATION FOR EYE DISEASES

This session is to learn about the basic examination of eyes, and visual disorders. You will also learn about various terms and instruments used for eye tests.

A series of tests are performed by the eye care professionals to assess the vision by eye examination. People must have a routine eye check-up as it is being recommended by health professionals, as many of the eye diseases are asymptomatic. Through an eye examination, various eye diseases affecting the vision can be detected. An eye examination consists of the following tests:

### Visual acuity

It means the ability to know the details of the objects a person sees. The term 6/6 is more commonly used, which is represented in metres. Visual acuity for distance is measured by the Snellen chart.

### Refraction

A method used to correct the defect of vision is called refraction. Refraction consists of two parts.

1. Objective refraction
2. Subjective refraction

#### Objective refraction

Refraction done without any feedback from the patient is known as objective refraction. Objective refraction is done by retinoscopy or auto-refractor. Retinoscope is a device or instrument used for objective refraction.

#### Subjective refraction

Refraction that requires responses from the patient is known as subjective refraction. A trial frame and retinoscope is used by the professionals; the patient reads the eye chart. According to the line on the chart that the patient has read, lenses are selected for correction of error of refraction.



Fig. 5.3: Process of refraction



## Ocular motility

When the patient complains about double vision, ocular motility is tested for diseases of muscles around the eyes. The patient is asked to move the eyes in nine cardinal directions of the gaze. The extra ocular muscles are tested in the directions of action of inferior, superior, lateral and medial rectus muscles, superior and inferior oblique muscles.

## Visual field testing

This test is done to assess the central and peripheral fields of vision.

## External examination of eyes

This includes an inspection of the eyelids, the position of eyes and the surrounding structure of eyes.

## Slit-lamp examination

In this procedure, the eyes are examined through an optical system that magnifies the image of the eye.

## Intraocular pressure

It is the fluid pressure inside the eye. Intraocular pressure is measured by a device called tonometer. The normal range is 10–21 mmHg.

## Fundus examination

This is an important part of eye examination. During fundus examination, the optic disc and retinal vasculature, media are viewed and the observations are recorded. This examination of eyes is done from a distance of about 50 cm.

### Practical Exercise

Visit an eye unit or clinic to understand the role of personnel in vision care services, and to observe the functions of equipments used for the examination of eyes.

## Check Your Progress

### A. Fill in the blanks

1. \_\_\_\_\_ is done to assess the extent of the peripheral field.
2. A \_\_\_\_\_ trial frame is used by the professionals.
3. \_\_\_\_\_ is done by retinoscopy or autorefractor.

### B. Short answer questions

1. What is IOP? Give the normal range of IOP.
2. What is visual acuity?
3. Emphasis is given on movement of eye in various directions. What is this condition known as?

### C. State whether the following are True or False

1. Refraction is a method to correct the defects of vision.
2. Visual field testing is done to assess visual acuity.
3. Intraocular pressure (IOP) is also known as refractive error.

## SESSION 3: EYE EXAMINATION

In this session, you will learn about the basic eye examination methods and the procedures to conduct the eye tests by various equipments. To check for eye diseases and the vision, a series of tests are designed. A variety of instruments and equipments are used. The procedures of eye examination are as follows:

### Check visual acuity

Clarity or a sharp vision is called visual acuity. A routine examination is mandatory in case of visual acuity for all patients. Several charts of test letters are used among which commonly used is the Snellen chart. The patient is seated 20-feet away from the Snellen chart, a clean card is placed in front of one eye, then in front of the other eye. The chart has letters of reducing size from top to bottom. The patient has to read the chart from the top most to the lower most lines. A patient who is able to read the letters of the 20/20 line from a distance of 20 feet is said to have a 20/20 vision. The process is applied for the other





eye too. The test should be repeated with glasses being used by the patient. The vision recorded without glasses is uncorrected vision and with glasses is corrected vision.

## Colour vision

### Colour vision test

This tests a person's ability to distinguish between primary colours and shades. The test by Ishihara is the most common test in use.

### Ritter

A series of plates made up of dots of primary colours is used. A person with normal colour perception can identify the pattern in which the dots are set up. A colour-deficient person finds it difficult to identify the different patterns of colours.

## Practical Exercises

Visit an eye unit or clinic to observe the methods of eye examination and testing colour vision.

## Check Your Progress

### A. Fill in the blanks

1. A \_\_\_\_\_ tests a person's ability to distinguish between the primary \_\_\_\_\_ and shades.

### B. Short answer questions (30-40 words)

1. What is ritter?
2. Which is the most common test for checking colour vision defect?
3. List the equipment used for eye examination.

## SESSION 4: VISUAL ASSESSMENT OF THE EYE

You will learn about the basic visual assessment techniques. Ophthalmoscopy is usually part of a routine eye test to screen the eye diseases, at the back of the eye. The back of the eye is called the fundus.

BASIC VISUAL ASSESSMENT

## NOTES





Fig. 5.4: Ophthalmoscope

It consists of:

- Retina
- Optic disc
- Choroid layer

This test may also be advised to observe the media and blood vessels, affected by high blood pressure or diabetes. The equipment used to examine the retina is called an ophthalmoscope (Fig.5.4). Ophthalmoscopy or fundoscopy or examination of the retina is a procedure to screen eye diseases. These include:

- Diabetic retinopathy
- Glaucoma (rise in pressure of the eye)
- Eye disease caused by High blood pressure
- Macular degeneration (loss of vision in the centre of the visual field)

### Preparation for treatment

Eye drops are used to dilate the pupils. This makes the pupils larger and easy to look through. However, the eye drops make vision blurry and sensitive to light for a few hours. The patient should arrange for someone to drive back after the test. He/she should use dark glasses for few hours after the test and take rest for the day. If a patient is allergic to some medication, he/she should tell the ophthalmologist. Eye drops should not be used without the doctor's advice as it can cause an allergic reaction. Finally, the patient should tell the ophthalmologist if he/she has glaucoma or has a family history of glaucoma. Most eye doctors will not use eye drops on a patient with suspected glaucoma. The drops can raise the intraocular pressure of eyes.

### Procedure

Before ophthalmoscopy, the patient may receive eye drops to dilate the pupils. The drop may sting for a few seconds. Drops can also cause an unusual taste. The goal is to get the best view of the back of the eye.

### Direct examination

The patient is seated in a chair for direct examination. The lights in the room are turned off (see Fig. 5.5).



The ophthalmologist sits across the patient and uses an ophthalmoscope to examine the eyes. An ophthalmoscope is an instrument that has a source of light and several small lenses for an ophthalmologist to look through. The ophthalmologist may ask the patient to look in certain directions to view the back of the eye. The bright light may be slightly uncomfortable and can cause after-images to appear. However, it does not cause pain.



*Fig. 5.5 Direct examination*

### **Indirect examination**

This test allows the doctor to view the structures at the back of the eye in greater detail (Fig. 5.6). For this test, the patient will be asked to lie down or sit in a reclined position. The ophthalmologist will have a bright light positioned around his forehead so that the beam of light will pass through the eyes. A convex lens will be held in front of the eye. Then, the doctor will hold the lids and the eye is opened to look into. Pressure may also be applied to the eye with a small, blunt probe. This may cause discomfort but not pain. A lens of 13D power is placed near the eye to condense light to focus on the eye.



*Fig. 5.6 Indirect examination*

### **Slit-lamp examination**

This procedure gives the ophthalmologist the same view of the eyes as indirect examination, but with a higher magnification (Fig. 5.7). The ophthalmologist sits with the instrument in front of the patient. There is place for the patient to rest the chin and the forehead. This keeps the head steady during the examination. A bright light is turned on in front of the eye. The ophthalmologist will use a microscope to look into the eye to view the structures at the back of the eye. The patient is asked



*Fig. 5.7 Slit-lamp examination*



## NOTES

to look in different directions. The ophthalmologist uses fingers to open the eye for a better view. This examination may cause discomfort, but is not painful. The patient may see after-images after the light of the slit-lamp is turned off. They will go away after blinking several times.

### Risks

The only risk of ophthalmoscopy is that of an allergic reaction to the eye drops. Such reactions are rare. However, they may cause

- Dry mouth
- Flushing of face
- Instant rise of intraocular pressure
- Dizziness
- Nausea and vomiting

### Steps of eye examination

#### Check visual acuity (VA)

This should be done by first having the examinee wear his or her corrective lenses, then recheck without correction.

#### Check near visual acuity

Let the examinee read a card, held approximately 14 inches (35.6 cm) away, at a normal reading distance. Use bright lighting during this test. Decreased near visual acuity could be due to central cataract or presbyopia—presbyopia affects most people after the age of 40. As age advances, the lens of eye loses its ability to accommodate to focus small letters, or small objects at near distance.

#### Test peripheral vision by checking visual field

This is tested by confrontation method. The examinee focusses at a finger placed at a distance of  $\frac{1}{2}$  metre; the finger is moved in vertical and horizontal directions till it is invisible. The examinee should have at least 70 degrees of vision in the meridian of each eye.



## Test colour vision

Ask the examinee to look at the colours on the eye chart and identify them, particularly red and green.

## Stereopsis

Stereopsis is a term that is most often used to refer to the perception of depth and 3D structure obtained on the basis of visual information with reference to binocular vision and monocular vision. We do not have a specific test for depth perception but we do ask the patient if he is able to see with both eyes or with just one.

## Eye examination

### Conjunctiva

Inspect the bulbar conjunctiva (on the globe) and palpebral conjunctiva (on the internal surface of the lids) for blood vessels, secretions, or redness, and presence of any foreign bodies. For the bulbar conjunctiva, note the colour of the underlying sclera, as well as any unusual vascularity and prominence.

### Cornea

Inspect the cornea for any deposits or defects, surface thinning, cloudiness, or presence of blood vessels invading the surface. Examine the tear film for both quantity and quality. Gently pull down the lower lid to check the quantity. A normal amount of tear film should leave 1 mm meniscus between the globe and the edge of the lower lid. Check the tear break-up time to check the quality of the outer oily layer to prevent evaporation.

### Lacrimal sac

To check the lacrimation system, put gentle pressure over the lacrimal sac area in between the inner end of the eye and the base of the nose.

### Lens

Look for any lens opacities or cloudiness, which may indicate the presence of a cataract.

## NOTES



## NOTES

### Practical Exercise

Visit an eye care unit or clinic to observe the visual assessment techniques.

### Check Your Progress

#### A. Fill in the blanks

1. \_\_\_\_\_ is a procedure to screen for eye diseases.
2. A lens of \_\_\_\_\_ is placed near the eye to condense light to focus on it.

#### B. Short answer questions (30-40 words)

1. What is ophthalmoscopy?
2. What is the back of the eye called?

